

ABSTRACT OF THE DISCLOSURE

Electrochemical cell stack comprises, in one embodiment, a plurality of cells arranged in series in a bipolar configuration, each cell including a proton exchange membrane (PEM), an anode positioned along one face of the PEM, and a cathode positioned along the other face of the PEM. A multi-layer metal screen for defining a first fluid cavity is placed in contact with the outer face of the anode, and an electrically-conductive, spring-like, porous pad for defining a second fluid cavity is placed in contact with the outer face of the cathode. The porous pad comprises a mat of carbon fibers having a density of about 0.2-0.55 g/cm³. Cell frames are placed in peripheral contact with the metal screen and the compression pad for peripherally containing fluids present therewithin. Electrically-conductive separators are placed in contact with the metal screen and the compression pad for axially containing fluids present therewithin. A reinforcing cylinder made of metal or rigid plastic peripherally surrounds the plurality of cells and provides structural support to the cell frames as they expand radially due to increasing temperature and/or internal fluid pressure.